# SIMMAX ENERGY

***Presents***

# A Bowman Microturbine at the Holiday Inn

January 20, 2004

Brian Inglett

SIMMAX

# SIMMAX Group of Companies

- SIMMAX Corporation
  - Simmax Energy, Simson Maxwell, ADCO Power
  - Develops, builds, owns and operates generation facilities
  - Provides Cogeneration/ Generation equipment sales and service
  - Experts in international power plant construction
  - In operation for over 60 years

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# SIMMAX Group of Companies

- SIMMAX Energy
  - "Simple Solutions - Maximum Energy"
  - Own and operate 14 DG sites in Southern CA
    - 5 Microturbine sites including Bowman, Ingersoll-Rand, and Turbec
  - In the business of selling ENERGY - not equipment

- TransAlta
  - SIMMAX financed by TransAlta
  - TransAlta Corporation
    - traded on the NYSE under the ticker TAC
    - $5 Billion in Assets and over 9,000 MW of generation

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# Organization

- Original Project development and funding was provided by Sempra Energy Connections
- Simmax acquired all Sempra Energy Connection sites in February 2003
- Sempra Energy Connections Project Manger – Alex Kim
- Engineering was provided by All Temperatures Controlled

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# Site Description

- Location – La Mirada, California
- 80kW Bowman Microturbine
- Peak shaving – Operating hours from 8:00am to 9:30pm
- Waste heat used for laundry and domestic hot water
- Electricity used for peak shaving

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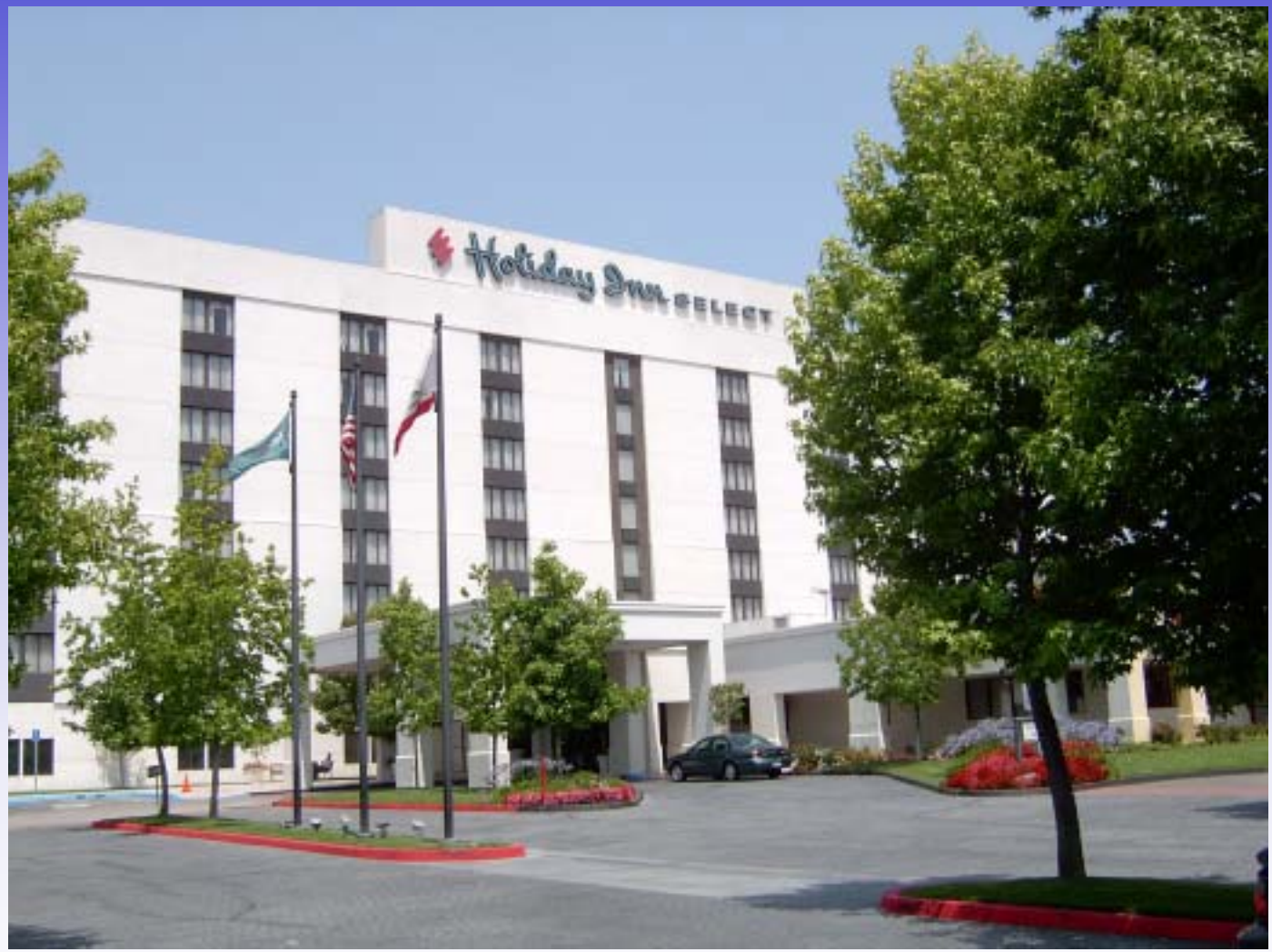
# Pictures

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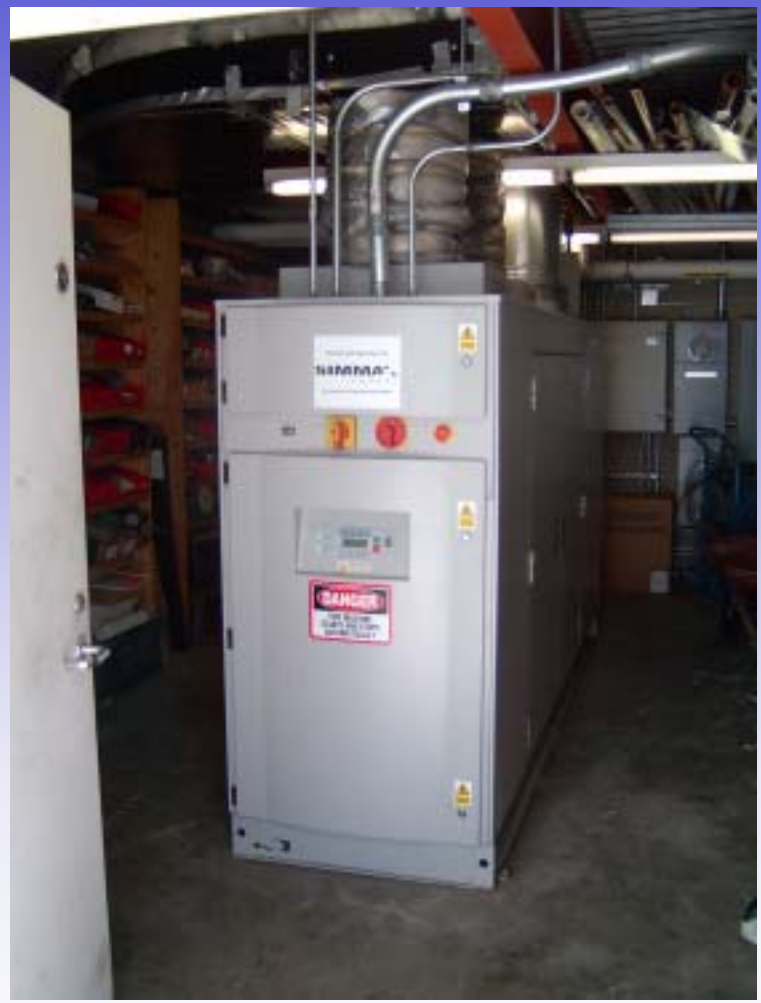


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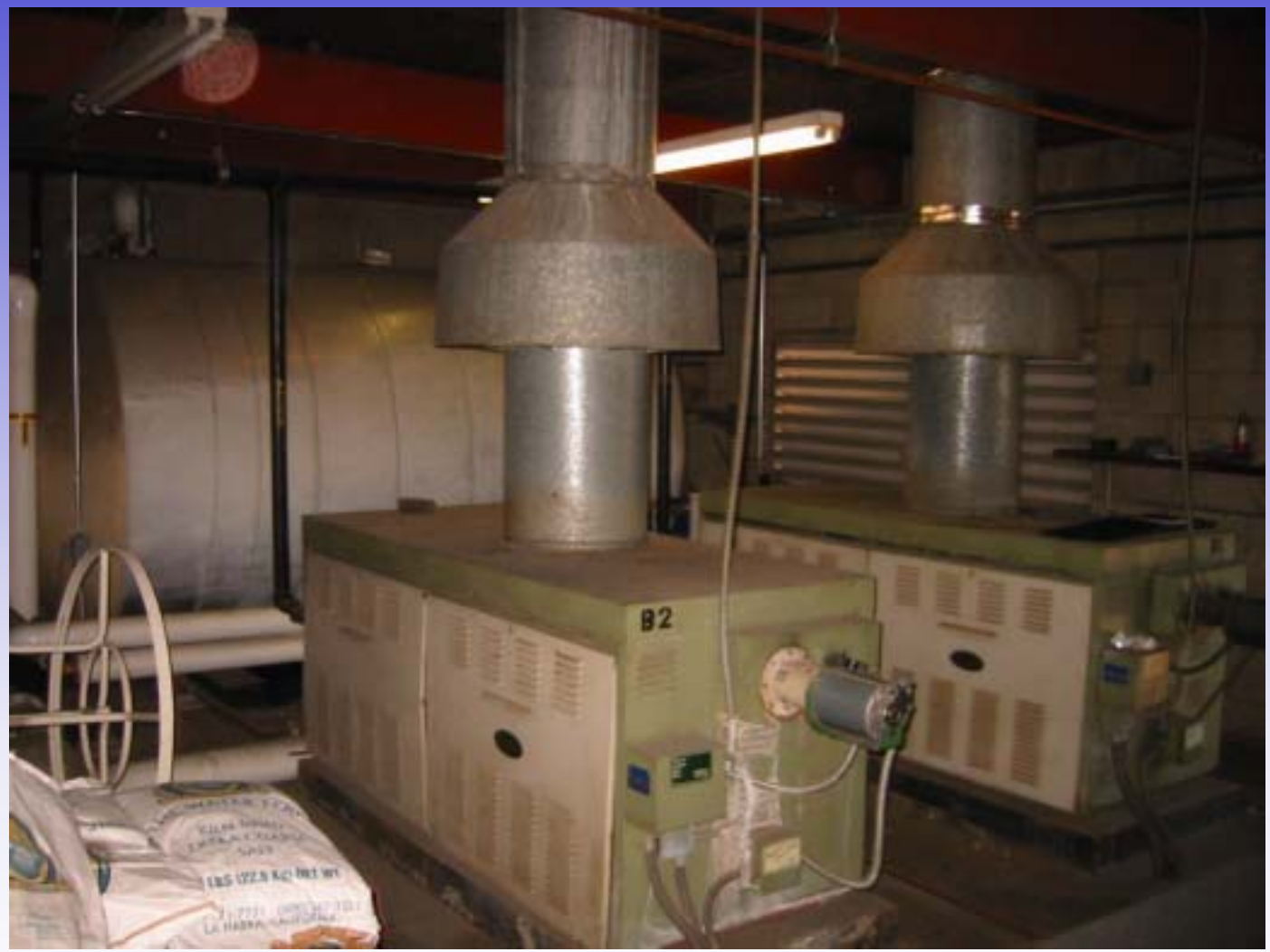


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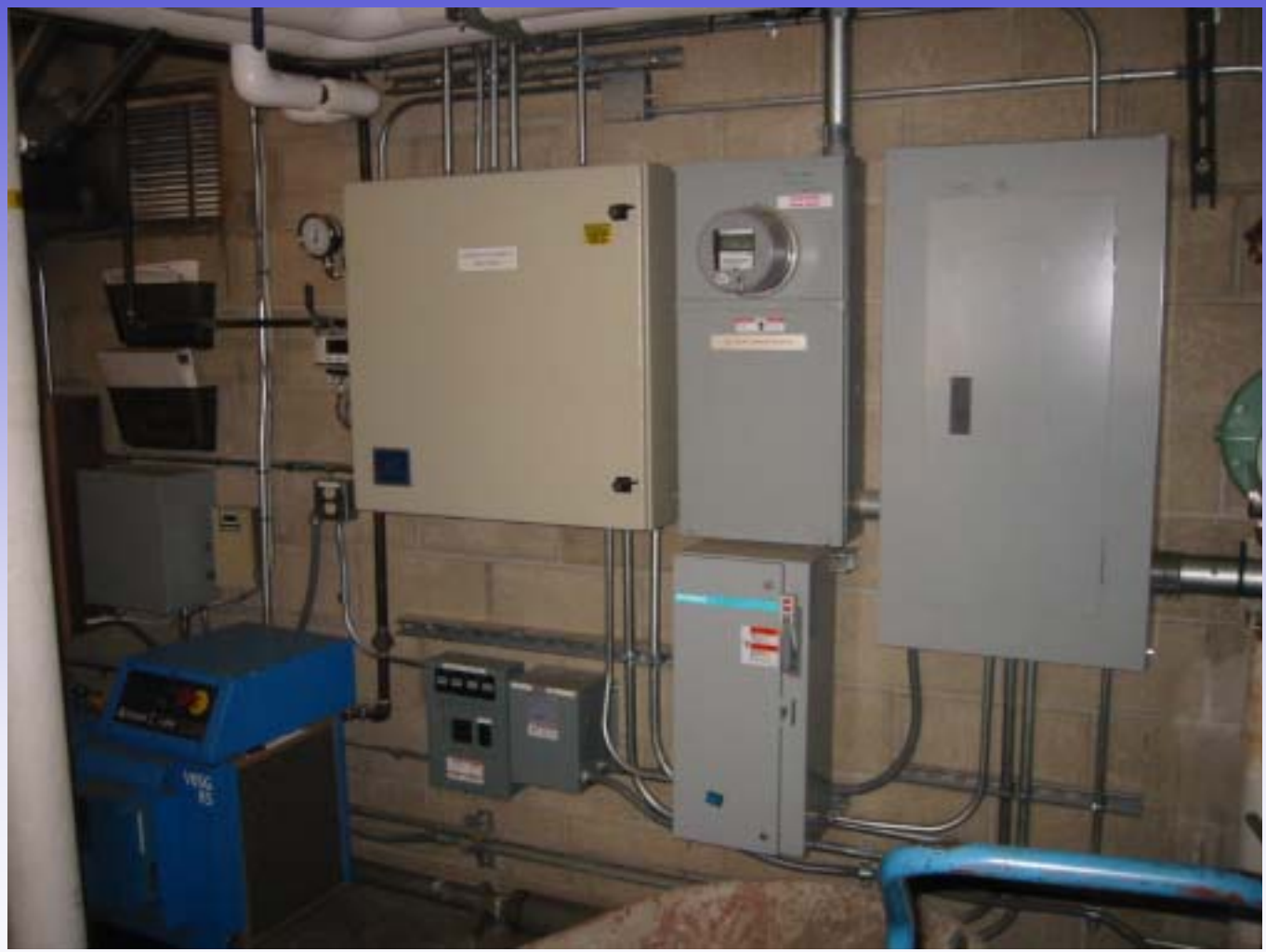

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# Costs

| | |
|---|---|
| Engineering Costs | $9,700 |
| Permitting Costs | $300 |
| Microturbine | $80,000 |
| Fluid Cooler | $5,000 |
| Construction Cost | $70,000 |
| Electrical Interconnection Cost | $500 |
| Gas Interconnection Cost | $5,200 |
| Heat Exchanger | $16,000 |
| Misc Costs | $27,300 |
| **Total Costs** | **$214,000** |

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# Costs Continued

- Previous owner spent an estimated $214,000 dollars on installation costs.
- A significant amount of this cost was spent on “learning the business.”
- There were change orders and costs associated with correcting design oversights.

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# Costs Continued

**100% Hindsight**

- More attention to the thermal load than the electrical load
- Application must be able to use most of the heat
- Size of hot water loop must be considered for thermal reaction time
- Applications may not be “plug-n-play”
- Proper engineering on the front end is an absolute must

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# Cost Continued

**50th Installation**

- Standardize fleet of generators being used
- Standardize the type of pumps, valves, heat exchangers and so on
- Build off of previous engineering experience to reduce engineering costs

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# Electrical Performance

- Hours of operation to December 31, 2002 is 9,800 hours.
- Average Electrical Performance is approximately 23% (Net).
- Electrical Power delivered to load is 78kW.
- Parasitic Losses are 5.5kW.
- Power Quality is approximately 2.0% or less THD per phase.

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# Improvements

- VFD used to replace the thermal switch control on the dump radiator
- Circulation pumps added to both laundry and domestic hot water loops to improve waste heat recovery.

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# Thermal Performance

- Measured maximum of 450 kBTU/hr (maximum heat from microturbine is 500 kBTU/hr).
- The site consumes an average of 375 kBTU/hr.
- Delta T across heat exchangers is 10 to 20 degrees F.  This varies as a function of site usage.
- Average Thermal Efficiency is measured at 44%.
- Expected Peak Total System Efficiency (Electrical + Thermal) is 75%.

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# O&M Performance

- Availability is 85.28%
- Average number of hours the unit is down per month is 7 hours.
- Annual O&M costs are difficult to estimate outside of the warranty. Annual PM costs are estimated at $3,000 annually.
- Unscheduled failures can impact O&M costs significantly. Spare part availability and cost are current industry issues.

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# Institutional Experience

- Site developed by Sempra Energy Connections.
- Permitting issues can cause the project to slip schedule.
- CARB (California Air Resources Board) requirements for January 1, 2003 compliance is an issue in the California market.
- The electrical interconnection has not been an issue to date.

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# Supplier Support

- Bowman Power's Technical Support is very good.
- Trained Distributor Technical Support is still developing.
- Spare parts availability is an issue in their availability to have parts shipped from the manufacturer to the end user.  (There is a limited stock of spare parts locally.)

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# Supplier Support Continued

- Bowman has performed very well in supporting and resolving all warranty issues.

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# General Experience

Improvements for future installations:

- Packaging for smaller footprints
- Integrating the fuel gas compressor into the package
- UL certification
- CARB certification

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# General Experience Continued

**Future market development will be driven by economics.**

- Existing transmission grid is heavily loaded. Distributed generation can relieve a portion of this loading.
- Lowered installation and maintenance costs.

**R&D or development should continue to support complimentary technologies.**

- Absorption Chilling

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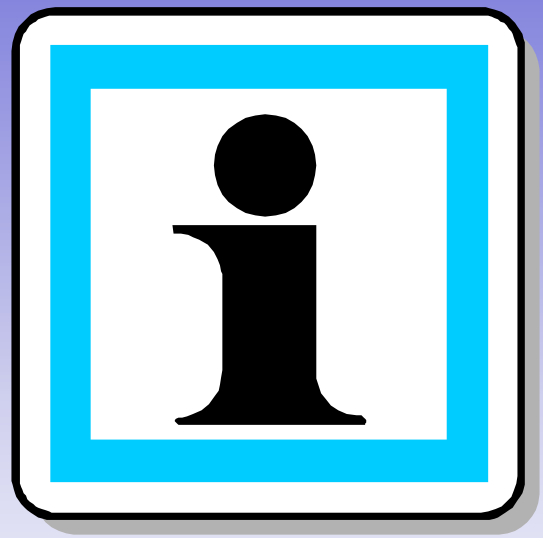
# Questions?



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